MUREX

Operating Manual

Transmig 305S & 405S

Please ensure that this Instruction Manual is made available to the user of the equipment

Contents

WARNING

This welding equipment has been designed, manufactured and tested to the highest standards to ensure long and trouble free life. However, regular maintenance is an essential part of keeping the machine operating in a reliable and safe manner and your attention is drawn to any maintenance instructions that are contained in this manual.

In general, all welding equipment should be thoroughly inspected, tested and serviced at least annually. More frequent checking will be required when the equipment is heavily used.

Wear and tear, particularly in electro-mechanical and moving components, are gradual processes. Caught in time, repair costs are small and the benefits in performance reliability and safety are significant. Left alone, they can put the equipment, and you, at risk.

Have this equipment regularly inspected and maintained by an approved service centre.

WARNING

ARC WELDING AND CUTTING CAN BE INJURIOUS TO YOURSELF AND OTHERS. TAKE PRECAUTIONS WHEN WELDING. ASK FOR YOUR EMPLOYER'S SAFETY PRACTICES WHICH SHOULD BE BASED ON MANUFACTURERS' HAZARD DATA.

ELECTRIC SHOCK - Can Kill

- Install and earth the welding unit in accordance with applicable standards.
- Do not touch live electrical parts or electrodes with bare skin, wet gloves, or wet clothing.
- Insulate yourself from earth and work.
- Ensure your working position is secure.

FUMES AND GASES – Can be Dangerous to Health

- Keep your head out of the fumes.
- Use ventilation, extraction at the arc, or both, to keep fumes and gases from your breathing zone and the general area.

ARC RAYS – Can Injure Eyes and Burn Skin

- Protect your eyes and body. Use the correct welding screen and filter lens and wear protective clothing.
- Protect bystanders with suitable screens or curtains.

NOISE– Excessive noise can damage hearing

- Protect your ears. Use ear defenders or other hearing protection.
- Warn bystanders of the risks.

READ AND UNDERSTAND THE INSTRUCTION MANUAL BEFORE INSTALLING OR OPERATING AND SEE WMA PUBLICATION 237 'The arc welder at work' AVAILABLE FROM THE MANUFACTURER.

PROTECT YOURSELF AND OTHERS

SAFETY

In any arc welding or gouging operation, it is the responsibility of the user to observe certain safety rules to ensure his personal safety and to protect those working near him.

Read all safety articles relevant to arc welding published by the WMA. Pay particular attention to any CAUTION or WARNING Notes included in this manual. CAUTION indicates possible equipment damage. WARNING indicates possible hazard to life.

> ⚠ **WARNING** ⚠
>
> *The ON/OFF switch on this equipment does not isolate the unit from the mains electrical supply.* ***AC POWER IS PRESENT ON THE ON/OFF SWITCH TERMINALS.*** *The On/Off lamp is an indication that the supply is switched on and does not imply that the unit is isolated from the supply.* ***BEFORE REMOVING THE COVERS FOR MAINTENANCE, ISOLATE THE UNIT FROM THE MAINS ELECTRICAL SUPPLY.***

1. Electrical

⚠ Treat electricity with respect. Even the open circuit voltage of this equipment can be dangerous. Adjustments to the torch or replacement of torch parts should be undertaken with the mains supply isolated from the unit.

If damaged torch cables or torch components are found, the unit must be disconnected from the mains and defective parts must be replaced using only Murex spare parts.

⚠ Do not work on live circuits or cables. Disconnect the main power supply. before checking the machine or performing any maintenance operation.

⚠ Be sure the case of the welding machine is properly connected to a good electrical earth.

⚠ Have the wiring for the welding machine installed by a qualified electrician. All connections must be made according to specifications in force and to general safety standards.

⚠ Do not stand in water or on damp floors while using an arc welder or cutter. Do not use in the rain.

⚠ Do not operate with worn or poorly connected cables. Inspect all cables frequently for insulation failure, exposed wires and loose connections.

⚠ Do not overload cables or continue to operate with overheating cables. Cables which are too small for the current carried will overheat, causing rapid deterioration of the insulation.

⚠ Pay attention that live parts of the torch do not touch any metal which is connected to the earth cable. Fix an insulated hook to hang the torch on when it is not in use.

1. Ventilation

⚠ Do not weld or cut on containers which have held combustible or flammable materials, or materials which give off flammable or toxic vapours when heated, without proper cleaning.

⚠ Locate the welding/cutting operation far enough from any vapour-type degreaser using trichlorethylene or other chlorinated hydrocarbons as solvents. The ultraviolet light from the arc can decompose these vapours into toxic gases at a considerable distance from the arc, even though the concentration of the gases is low enough to be undetectable by smell.

⚠ Be sure to provide adequate ventilation for removal and dilution of fume and gases. Fume exhaust facilities near the arc, or a ventilated helmet should be used when cutting in confined spaces or on toxic material.

2. Glare

⚠ Never look at the arc without wearing eye protection.

Always use the proper protective clothing, filter glasses, and gloves. Be careful to avoid exposed skin areas. Do not use cracked or defective helmets or shields.

⚠ Never strike an arc when there is someone near who is not protected from the strong light of the arc.

⚠ Warn bystanders who are not aware of the dangers of ultra-violet light.

3. General

⚠ Take care when lifting the unit.

⚠ Ensure that cylinders are secured by chains.

⚠ Locate the unit so that there is adequate air flow to the ventilation louvres.

⚠ Always dress correctly to protect against glare, radiation and spatter.

4. Fire

⚠ Ensure that the correct type of fire extinguisher is available in the welding area.

⚠ Do not weld near flammable materials or liquids, in or near explosive atmospheres, or on pipes carrying explosive gases.

5. Vehicle Electrics

⚠ When working on motor vehicles, remove the battery and any circuitry which may be damaged by the arc.

⚠ Whilst welding be aware of the possibility of 'hidden wires' behind panels or bulkheads.

GENERAL

The Transmig 305S and Transmig 405S (TM 305S & TM 405S) are constant voltage characteristic welding power supply units designed for use in MIG/MAG dip transfer and spray transfer modes.

Inductance output sockets (XS2 A, B & C) are provided for these techniques (see below).

In addition to the welding output, these units provide 42 volts and contactor control circuit outputs to a wire feed unit (socket on rear panel). Both units can be used in conjunction with the Transmatic 2 x 2, 4 x 4 and 4 x 4HD Feed Units. Details of interconnections to these feeders are given at the front of the Parts List under 'Optional Extras'.

A 42 volts a.c. outlet is supplied on a terminal block inside the unit to supply a CO_2 Heater if required (see installation, page 6).

A water cooler may be fitted to the unit by mounting it on the cylinder carrier plate on the back panel.

220 volts a.c. is provided on a terminal block inside the unit to power the cooler (see installation, page 6).

A thermostatically controlled cooling fan is mounted inside the rear panel. This fan normally runs at reduced power but if the temperature rises, the fan speed increases. Once the power source has cooled down, the fan returns to a low speed. The fan draws air in via the louvres in the front and side panels, and expels through the rear, cooling the rectifiers and other components. To operate efficiently these louvres must be kept free from obstruction.

Reduced air flow may cause a thermal overload (over-heating).

A thermostat protects he unit from thermal overload. This thermostat is mounted on the rectifier assembly (see Parts List) and disables the control circuit in the event of overheating. Should the overload lamp light (see below) cease welding, keep the mains switched on leaving the fan running to minimise the cooling time, and leave the unit to cool. Investigate the cause of overheating (ventilation, fan failure etc.).

Circuit breakers on the rear panel, protect the circuits from excess current overload. They are reset by pushing in the buttons.

WARNING

Persistent operation of the circuit breakers must be investigated.

Under no conditions should they be held on artificially (override device etc.)

A Voltmeter and Ammeter mounted on the front panel indicate actual welding voltage and welding current values.

The 'Press to read' button activates the welding output voltage allowing the O.C.V. (Open Circuit Voltage) to be checked.

The Voltage Selection switches provide coarse and fine control of output voltage.

CONTROLS

Overload Lamp

Ammeter
Under welding conditions indicates welding current

Voltmeter
Indicates actual welding voltage.

Press-to-read OCV switch

ON/OFF Lamp
Indicates welding power is switched on.

ON/OFF switch
Note: *This switch does not isolate the unit from the mains supply.*

'Fine' output Control

'Coarse' output Control

-VE Welding power Minimum Inductance
For short arc welding of thin materials root runs, aluminium and cored wires.

-VE Welding power Medium Inductance
Used for short arc welding, gives slightly increased heat input.

+VE Welding power output socket
Positive polarity output to wire feed unit.
Also duplicated on the rear panel.

-VE Welding power Maximum Inductance
Used for spray arc welding of thick materials.

INSTALLATION

WARNING

Installation should only be undertaken by a qualified electrician or trained individual.

Correct installation is important for the reliable and safe operation of the equipment. Before continuing carry out the following checks:

1. Having unpacked the power source, inspect for evidence of damage or missing parts. Notify the carrier or Murex immediately.

2. Check the air louvres in the front and rear panels for any packing materials that might obstruct the air flow.

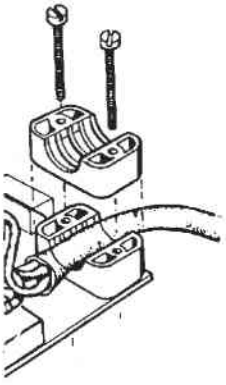
3. Position the equipment in a safe area. Leave at lest 0.5m clearance around the unit to allow air to circulate freely. The position should be free from dust, fumes and heat. See SAFETY at the front of this manual.

Connection to Mains Supply

WARNING

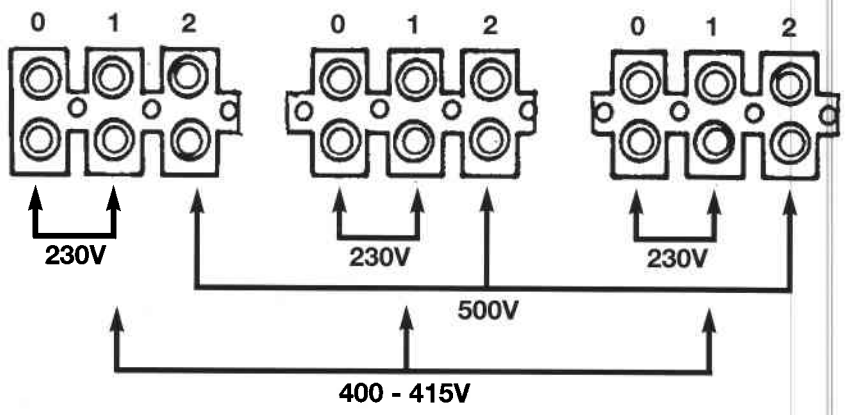
Before making electrical input connections to the unit, use 'machinery lockout procedures'. If the connection is to be made from a mains disconnect switch, the switch should be padlocked in the off position. If the connection is made from a fuse box, remove the fuses from the box and padlock the cover in the closed position. If locking facilities are not available, attach a red tag to the mains disconnect switch (or fuse) to warn others that the circuit is being worked on.

Placing the machine unit power switch in the 'Off' position does not shut off all the power within the equipment.

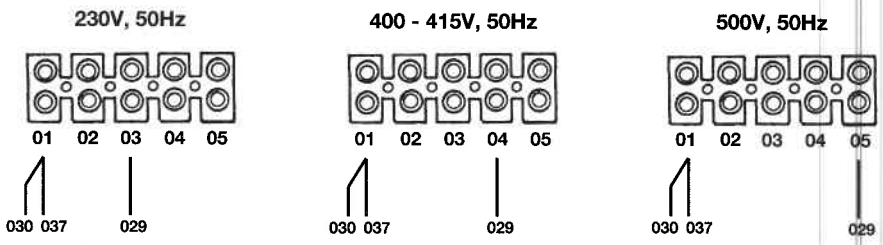


Clamp the input cable firmly
MAINS CABLE INPUT
Connect the mains input cable to TB XT1

TERMINAL BOARD XT2 MAINS VOLTAGE SELECTION



AUXILIARY TRANSFORMER MAINS VOLTAGE SELECTION



The Murex Transmig 305S or 405S power source requires industrial 3 phase mains power of the proper voltage, 230, 400, 415 or 500V, see SPECIFICATION section, page 7.

WARNING

From the factory the machine is set for 415V use and the fitted primary cable is suitable for use with 400V or 415V supplies only.

Fitting Optional Extras

Terminal Boards XT3 and XT5 provide a means of connection to the various auxiliary supplies available.

WARNING

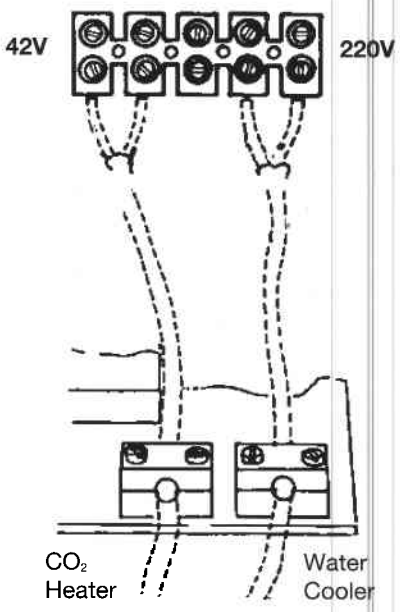
Ensure suitable strain reliefs are fitted when routing cables through the rear panel.

42V and 220V a.c. auxiliaries are protected by resettable circuit breakers and accessible on the rear panel.

WARNING

The 220V a.c. auxiliary is not isolated from the incoming mains and is for use with suitable torch water cooling units only.

TBXT5 & TBXT3 AUXILIARY SUPPLIES

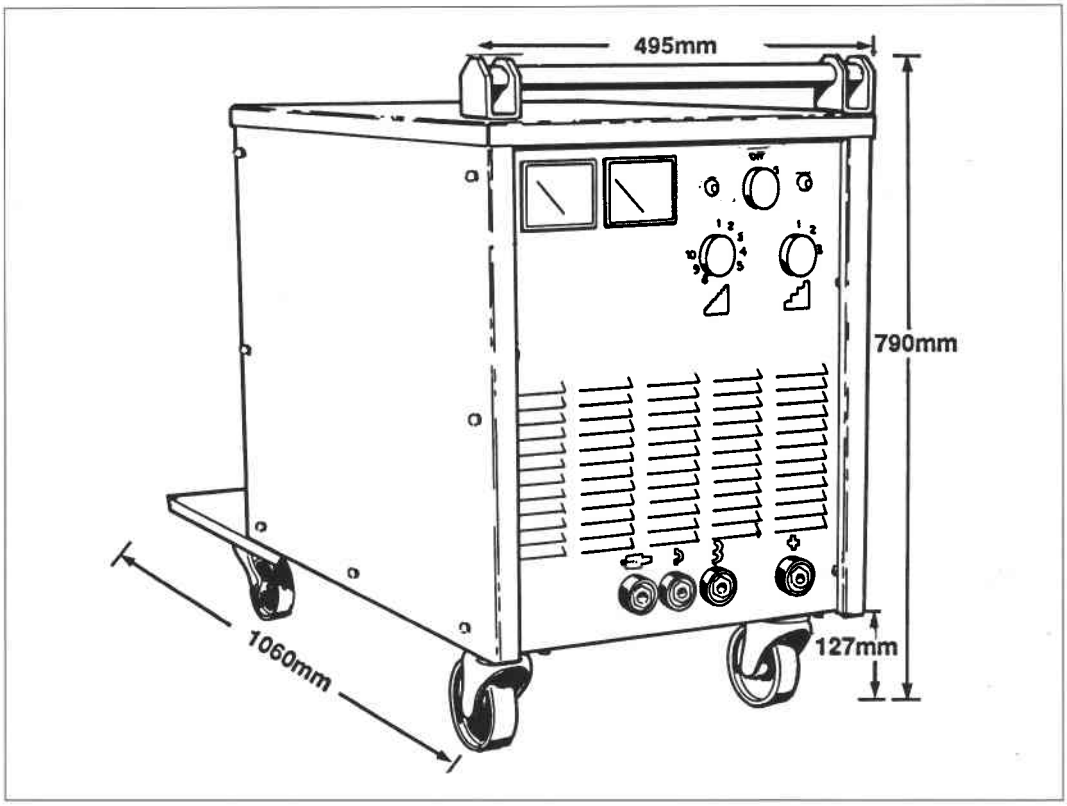


Connect to auxiliary supplies as required taking care to clamp the cables (as shown)

Transmig 305S & 405S

Technical Notes

SPECIFICATION



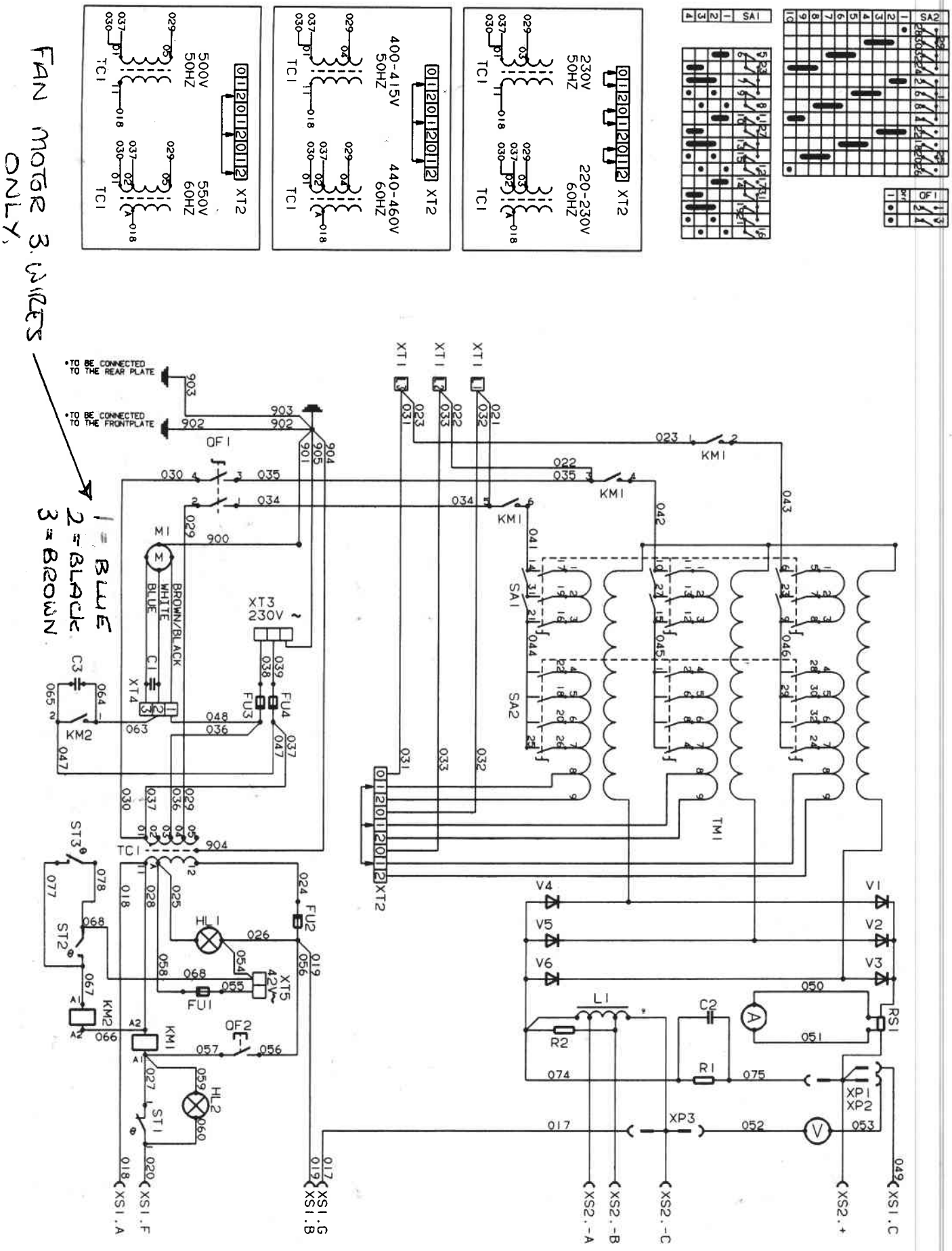
INPUT		
	TM 305S	TM405S
Phase:	3	3
Frequency:	50/60Hz	50/60Hz
Max current at 420V:	18A	28A
Max kVA	13kVA	20kVA
Fuse rating 420V supply:	20A	35A
Nominal Voltage:	230/400 - 415/500V 50Hz	
	220/440 - 460/550V 60Hz	

OUTPUT		
	TM305S	TM405S
Open Circuit voltage:	39V max.	46V max
Current range:	60A:15V	60A:17V
	300A:30V	400A:36V
Rated output: 100%	250A/27V	320A/30V
60%	300A/30V	400A/34V
Permitted max current:	300A	400A
Control:	40 Switch Positions	
Inductance Taps:	3	3

OTHER DATA

Rating specification:	IEC 974-1	
Ambient temperature:	40°C	
Insulation class:	H	
Max temperature rise:	140°C	
Weight:	TM305S	TM405S
	160Kg	200Kg

Due to variations which can occur in manufactured products, claimed performance voltages, ratings, all capacities, measurements, dimensions and weights quoted are approximate only. Achievable capacities and ratings in use and operation will depend upon correct installation, use, application, maintenance and service.


FAN MOTOR 3 WIRES ONLY,
1 = BLUE
2 = BLACK
3 = BROWN
*TO BE CONNECTED TO THE REAR PLATE
*TO BE CONNECTED TO THE FRONTPLATE
230V 50HZ 220-230V 60HZ
400-415V 50HZ 440-460V 60HZ
500V 50HZ 550V 60HZ
XT1
XT2
XT3 230V
XT4
XT5 42V
SA1
SA2
TM1
TC1
OF1
OF2
KM1
KM2
M1
FU1
FU2
FU3
FU4
HL1
HL2
ST1
ST2
ST3
C1
C2
C3
L1
R1
R2
RS1
V1
V2
V3
V4
V5
V6
XP1
XP2
XP3
XS1.A
XS1.B
XS1.C
XS1.F
XS2.-A
XS2.-B
XS2.-C
XS2.+

CIRCUIT DESCRIPTION

Welding Supply

The mains input is applied to Terminal Block TBXT2 and is connected to the primary of transformer TM1 when contactor KM1 closes.

It can be seen that, with the 230 volt links only in position as shown (see also pages 6 and 8). TM1 primary is connected as a delta winding for a fixed, 3 phase voltage of 230 volts.

With the 400-415/500V links in position (230V links removed), the primary is star wired and the links add or remove lower sections of the primary winding as necessary.

NOTE

When selecting the input voltage, the connections on the Auxiliary Transformer TC1 must also be set. (See pages 6 and 8).

Fine and coarse settings are achieved by switching in or out sections of the primary winding, resulting in changes to the transformation ratio of the transformer, and hence the value of secondary output. The table opposite shows the switch contacts for various settings.

The output from TM1 is rectified by diodes V1-V3 (pos.) and V4-V6 (neg.). Shunt RS1 'senses' the output current which is displayed by the ammeter A. R1/C2 are transient suppressors and voltmeter V measures the output voltage across terminals XS2+ and XS2-.

Inductance L1 has three tappings (XS2-A, XS2-B and XS2-C) for use in various welding modes - see page 5.

The output voltage is taken to pins C and G of the control socket XS1.

Auxiliary Supplies

Switch OF1 connects mains supply voltage to the primary of Auxiliary Transformer TC1.

NOTE

The connections on this terminal block must be changed to match the mains input voltage - see pages 6 and 8.

220V for the Fan M (via TBXT4) and Water Cooler (via TBXT3) is taken from the primary of TC1. The fan is powered via capacitor C3. If the temperature rises above a set limit, thermostat ST2 or ST3 will cause KM2 to energise, and the fan will speed up until ST2 or ST3 re-sets.

The Water Cooler supply is protected by circuit breakers FU3 and FU4.

The 42V control voltage from TC1 secondary lights lamp HL1.

NOTE

This lamp indicates control voltage ON/OFF and does not signify isolation from the mains supply i.e. Mains Supply is still connnected to transformer TM1 primary and mains voltage selection blocks.

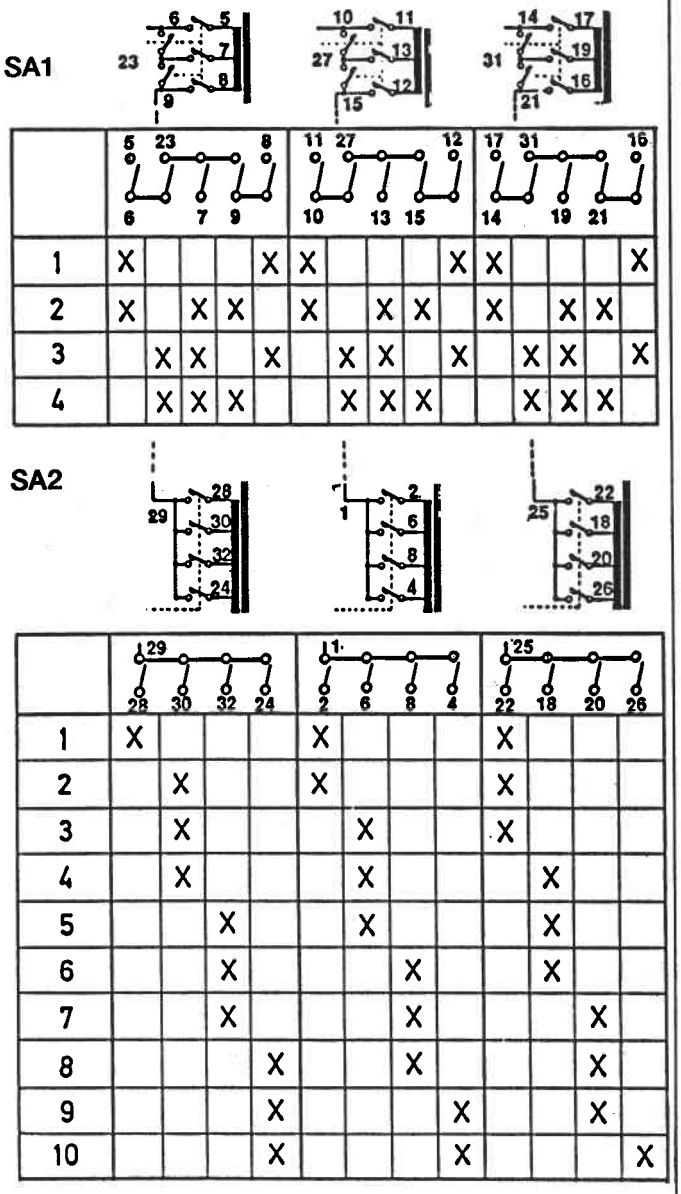
42 volts is taken to TB XT5 to power an external CO_2 Heater, this output is protected by circuit breaker FU1.

Control

When the torch switch is pressed, it completes a 42V circuit to main contactor KM1 via a thermostat ST1 and welding power is switched on by contacts KM1.

It can be seen that a thermal overload (ST1) will result in KM1 becoming de-energised, resulting in welding power being shut down until the unit cools and ST1 resets.

OF2 is a 'Press-to-read' button which energises the main contactor, allowing the open circuit volts to be read locally.



	5 23 8			11 27 12			17 31 16		
	6 7 9			10 13 15			14 19 21		
1	X		X	X		X	X		X
2	X	X	X	X	X	X	X	X	
3		X	X		X	X	X		X
4		X	X	X		X	X	X	

	29 28 30 32 24				1 2 6 8 4				25 22 18 20 26			
1	X				X				X			
2		X			X				X			
3		X				X			X			
4		X				X				X		
5			X			X				X		
6			X				X			X		
7			X				X				X	
8				X			X				X	
9				X				X			X	
10				X				X				X

FINE (SA2) & COARSE (SA1) SWITCH CONTACTS

X = Contacts Closed

MAINTENANCE

Insulation and Continuity Test Yearly (or after a long period of storage)

Carry out insulation resistance and continuity test as follows:-

1. Switch off and isolate the main supply.

2. Using an insulation/resistance tester (e.g. Megger) set on the ohms range, check for earth continuity between the mains lead earth terminal and all earthed components. A reading of zero ohms should be obtained. A simple bulb and battery may be used if a megger or similar is not available. The bulb should glow brightly if continuity is satisfactory.

3. Manually hold on contactor KM1 or short circuits its contacts.

4. Wire together the L1, L2 and L3 terminals (or the cable ends) to form a 'common junction'.

5. Turn the ON/OFF switch to the 'ON' position.

6. Wire together the (-) and (+) output sockets.

7. Using a 500V insulation tester (e.g. megger) check for an insulation resistance of at least 2m ohms between:

a. The input terminals 'common junction' and the output terminals.

b. The input terminals and pin F of XS1 (42V connections).

8. Remove all shorting links, release the contactor, reconnect to the mains supply and test the equipment before use.

Overload Protection

The overload protection thermostat is mounted on the diode bridge and will interrupt the welding current when the rectifier is overloaded. The current will automatically be reset when the unit is adequately cooled down.

If the unit shuts off, keep the mains switched on leaving the fan running to minimise the cooling time.

Schedule Maintenance

Daily

1. Check all welding and electrical cable for signs of cracking or general deterioration.

2. Check that all electrical and gas connections are in good physical condition.

3. Check the torch for damage. Replace any suspect part(s).

ALWAYS CHECK THE WELDING AREA DAILY FOR POSSIBLE SAFETY HAZARDS, IF IN DOUBT CONSULT YOUR SAFETY OFFICER.

Six-Monthly

1. Switch off the unit and disconnect from the mains electrical supply.

2. Remove the top and side covers (retain the fixing screws).

3. Using a soft brush, remove any dust or dirt from the interior of the unit. If compressed air is used to clean the unit the pressure must not exceed 2kg/cm^2 (30lb/in^2), and the air must be dry.

SUITABLE EYE AND MOUTH PROTECTION SHOULD BE WORN

4. Check the security of all components and connections.

5. Carry out an insulation and continuity test as detailed above.

6. Refit the covers.

Transmig 305S & 405S

Parts List

OPTIONAL EXTRAS	
Interconnections	
2 metre (TM 305S & TM 405S to TM 2 x 2 & TM 4 x 4	1413660
Work Return Cable and Clamp	
(TM 305S & TM 405S)	1409320

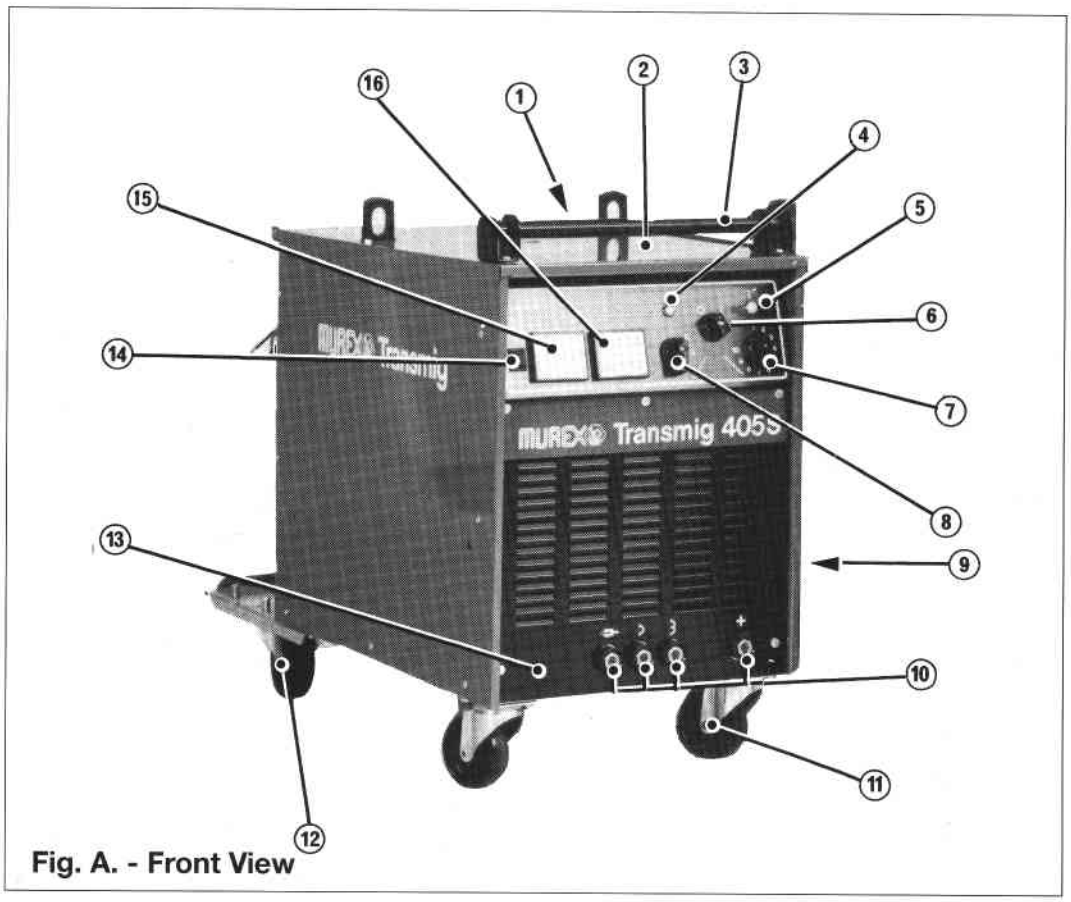


Fig. A. - Front View

TM 305S - Part No. 1414704
TM 405S - Part No. 1414706

Item	CCT Ref	TM 305S Part No	TM 405S Part No	Description
1	-	156654881	156654881	Pivot post
2	-	-	-	Top plate (Note 1)
3	-	-	-	Handle complete (Note 1)
4	HL2	192576004	192576004	Overload lamp
5	HL1	192576004	192576004	ON/OFF lamp
6	OF1	320746001	320746001	ON/OFF switch
-	-	1411688	1411688	Knob for item 6
7	SA2	320751002	320751002	Fine voltage switch - 10 position
8	SA1	1411690	1411690	Coarse voltage switch - 4 position
9	-	-	-	Side panel Left (Note 1)
9a	-	-	-	Side panel Right (Note 1)
10	XS2	17242	17242	Dinse socket
-	-	1380441	1380441	Dinse plugs for item 10
11	-	1409223	1409223	Swivel castors
12	-	1409222	1409222	Fixed castors
13	-	-	-	Front panel (Note 1)
14	OF2	1411698	1411698	Voltage switch
15	V	1407165	1407165	Voltmeter 60V
16	A	1407166	1407166	Ammeter

Note 1: Please note that these items must be ordered on a special order form and may be on extended delivery (contact MUREX WELDING PRODUCTS for details).

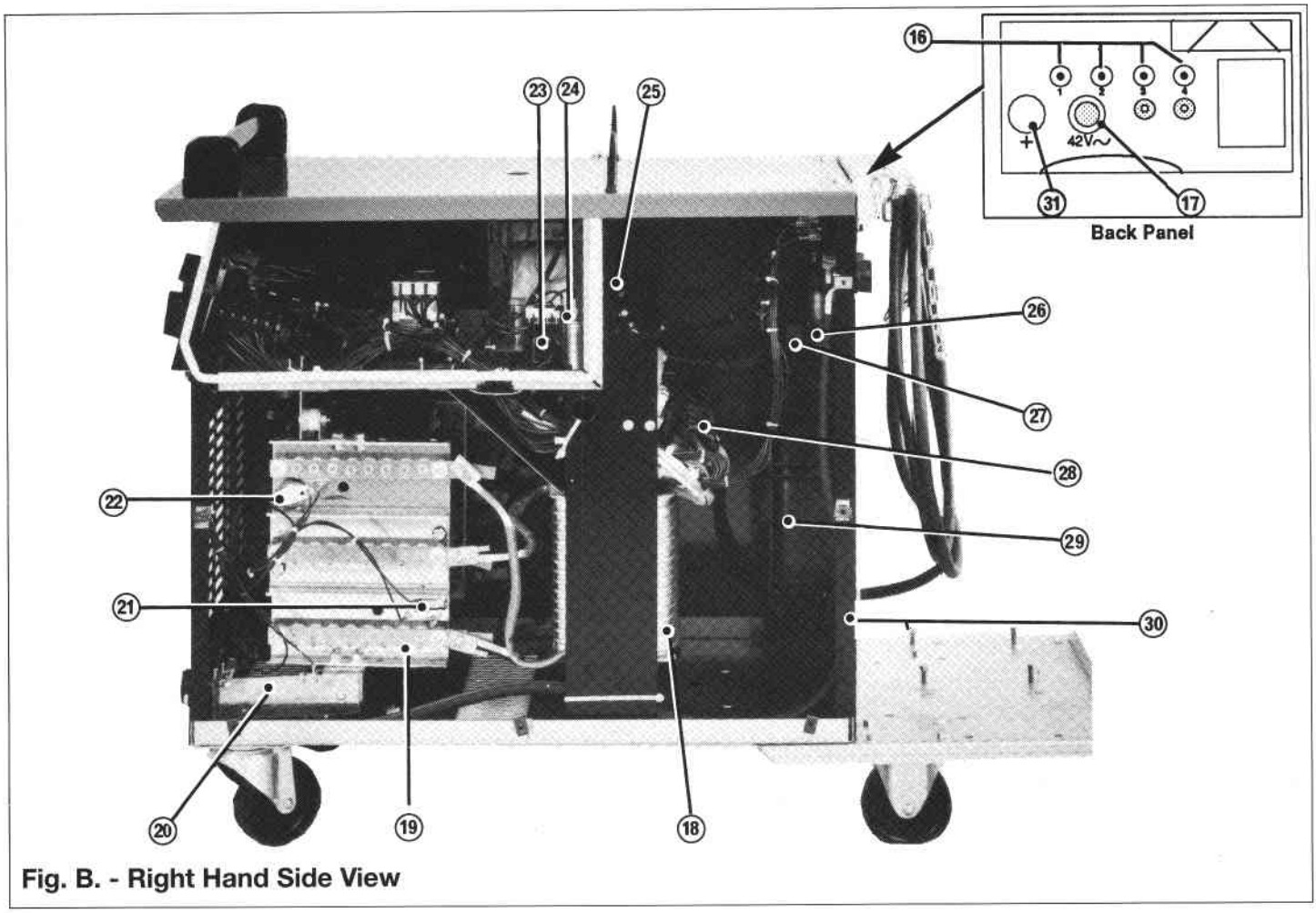


Fig. B. - Right Hand Side View

Item	CCT Ref	TM 305S Part No	TM 405S Part No	Description
16	FU1, FU3, FU4	193586101	193586101	Circuit breaker 5A
-	FU2	193586102	193586102	Circuit breaker 10A
17	XS1	538500108	538500108	42V Control socket
-	-	1411740	1411740	Plug for item 17
18	TM1	469278880	469278881	Main transformer
19	V1-V3	1413834	14138[illegible]35	Diode bridge (Positive)
-	-	321468003	321468003	Diode (Red)
20	RS1	1411723	1411723	Shunt
21	ST2, ST3	369904001	369904001	Thermostat (Fan)
22	ST1	319445001	319445001	Thermostat
23	KM2	193296101	193296101	Contactor (Fan)
24	C3	1414037	1414037	Capacitor (Fan speed)
25	XT2	1413837	1413837	Mains selection block
-	XT3, XT5	1411732	1411732	Terminal block 220V & 42V
26	C1	191085103	191085103	Capacitor (Fan start)
27	XT4	523104102	523104102	Terminal block (Fan)
28	-	191309112	191309112	Input cable clamp
29	M	162430001	162430001	Fan
30	-	-	-	Rear panel (Note 1)
31	-	17242	17242	Dinse socket
-	-	1380441	1380441	Plug for item 31

Note 1: Please note that these items must be ordered on a special order form and may be on extended delivery (contact MUREX WELDING PRODUCTS for details).

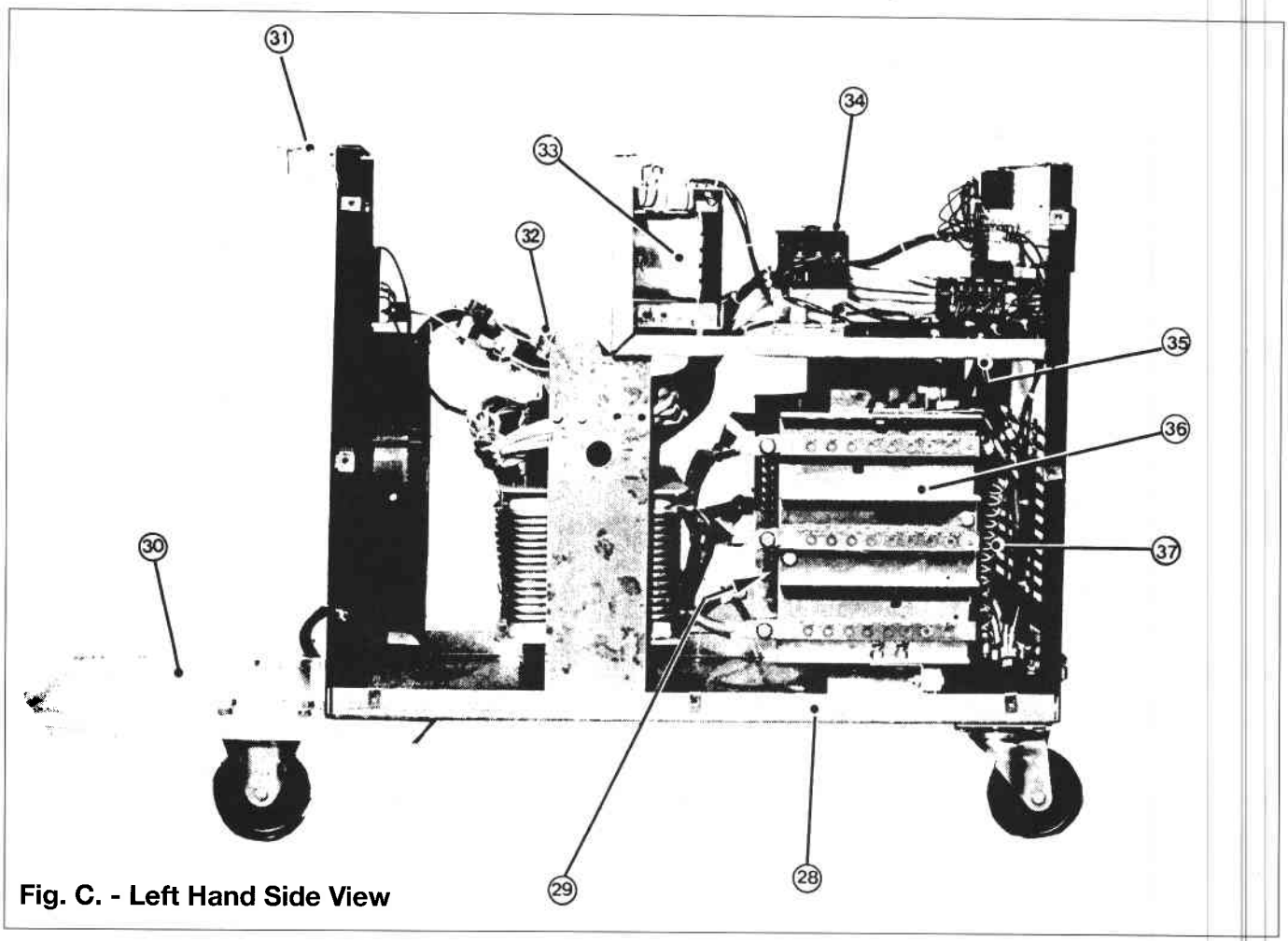


Fig. C. - Left Hand Side View

Item	CCT Ref	TM 305S Part No	TM 405S Part No	Description
31	-	-	-	Base plate (Note 1)
32	L1	469255883	469255883	Inductor complete
33	-	-	-	Cylinder carrier (Note 1)
34	-	-	-	Cylinder support plate (Note 1)
34a	-	321173001	321173001	Chain
35	XT1	162781002	162781002	Mains connection block
36	TC1	319469001	319469001	Auxiliary transformer
37	KM1	193297101	193297101	Contactor
38	C2	046006704	046006704	Capacitor
38a	R1	191093146	191093146	Resistor
39	V4-6	1413829 x	1413830 ✓	Diode bridge negative
39a	-	321468004 ✓	321468004 ✓	Diode (black)
40	R2	320007001	320007001	Resistor

Note 1: Please note that these items must be ordered on a special order form and may be on extended delivery (contact MUREX WELDING PRODUCTS for details).

NOTES

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